REDACTED

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

**ACTION MEMORANDUM**

**SUBJECT:** Request for a Removal Action at the Smokey Mountain Smelters, Knox County, Tennessee

**FROM:** Matthew J. Huyser
On-Scene Coordinator

**THRU:** Shane Hitchcock, Chief
Emergency Response & Removal Branch

9/11/08

**TO:** Franklin E. Hill, Director
Superfund Division

## I. PURPOSE

The purpose of this Action Memorandum is to request and document approval of a time-critical removal action at the Smokey Mountain Smelters Site (SMS or the Site) located at 1508 Maryville Pike, Knox County, Tennessee pursuant to Section 104 of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) as amended by 42 U.S.C. Section 9604. The Site poses a threat to public health, welfare, and the environment which meets the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) section 300.415(b) criteria for removal actions. The Site is an inactive and abandoned secondary aluminum recycling facility containing a significant amount of process waste and other contaminants that are being discharged to nearby surface waters and the air. The total project ceiling for this time-critical removal action, if approved, will be $375,600 of which $52,000 will be funded from the Regional Removal Allowance.

## II. SITE CONDITIONS AND BACKGROUND

### A. Site Description

Site ID: A4MD
CERCLIS: TND098071061

#### 1. Site History

The Site was originally owned by the Knoxville Fertilizer Company, which operated a fertilizer factory on the property beginning in the 1920's. American Agricultural Chemical purchased the fertilizer facility in 1963, and in 1965 merged into the Continental Oil Company along with the Agrico Chemical

Company. The Site sat idle for several years until 1979, when two private individuals purchased the property and founded Smokey Mountain Smelters (SMS), also known as Rotary Furnace, Inc.

SMS ceased operations and was abandoned in May, 1994. The facility has been inactive since that time. The last legal owner of the tracts of land on which the Site is located is deceased. His heirs have not claimed ownership of the Site. EPA investigations to this point have been conducted under the access authority granted by the State of Tennessee.

SMS operated between 1979 and 1994. The facility was a secondary aluminum smelting and casting operation. The process involved the melting of scrap aluminum and aluminum dross (a waste by-product of primary and secondary aluminum smelting) to remove impurities. A flux consisting of salts such as sodium chloride, potassium chloride, and cryolite ($Na_3AlF_6$) was added to the melt to protect against oxidation. The smelted aluminum was then cast ingots.

Raw materials at the facility primarily consisted of scrap aluminum and aluminum dross. Other raw materials included aluminum pot bottoms, bath pads, hood pads, pot pads, crushed materials, spent anode and cathode debris, dust, and other scraps with high aluminum contents (15 to 18%). Some of these materials such as the pot pads are generated during primary aluminum smelting inside of- and in contact with-spent potliners, which is a K088 listed waste. It should be noted however that no K088 wastes have been found on-Site or documented in shipping manifest records).

Waste material from the SMS operation was primarily saltcake, a residue from dross smelting with high salt (40 to 50%) and low metal content (4 to 5%). Other waste materials included baghouse dust (airborne particulates from the rotary furnaces) and discarded aluminum dross. Much of the Site is covered in a waste pile consisting of saltcake and aluminum dross that was dumped directly on the land surface without a landfill liner or adequate drainage controls. A USGS topographic map from 1966 shows two settling ponds on the Site at the time of the original fertilizer company. There are no records to indicate that the ponds were regraded prior to disposing of the saltcake on the Site, and it is assumed that they were filled in with waste materials from SMS. In addition, large amounts of waste and debris that had little to no recyclable or raw material value were disposed of at the Site, apparently by the same facilities that delivered the raw materials. These materials included oily scalper chips, furnace bottoms, magnetic separator accumulations, tabular balls, selee filters, ingot furnace bottoms, mold line floor sweepings, and general debris such as bricks and used pallets.

In 1983, the Tennessee Department of Health and Environment, Division of Solid Waste Management (DSW) issued a notice to SMS with the conclusion that the Site was "unsuitable for use as an industrial landfill;" landfilling on-site continued to occur for several years. In 1990, DSW issued a letter to SMS stating that the wastes generated from the SMS operation (including "old wastes...

estimated to be about ten years old") had been approved as "special wastes" to be disposed at a permitted off-site solid waste landfill. Within all records recovered at SMS, only two manifests were found which documented off-Site disposal of saltcake, totaling approximately 10 tons per load. In addition to land disposal violations, the Knox County Department for Air Pollution Control (KCDAPC) documented numerous citizen complaints throughout the 1980's regarding excessive air emissions from the Site. In response to these complaints, KCDAPC performed inspections and cited SMS for several air quality violations between 1983 and 1989.

In February 2001 the Tennessee Division of Superfund (DSF) held a public hearing regarding the addition of SMS to Tennessee's list of inactive hazardous substance sites. Several members of the public in attendance voiced concern regarding dangerous chemicals, alleged health problems, and potential harm to future generations. They also indicated that they had been expressing these concerns to the State for many years. The Site was added to the List of Inactive Hazardous Substance Sites, by action of the Tennessee Solid Waste Disposal Control Board on May 8, 2001, as Tennessee Division of Remediation Site Number 47-559.

**2. Previous Investigations**

Multiple sampling events between 1997 and 2006 have been conducted at the Site to characterize the composition and contaminant concentrations in the waste piles, the raw material piles, the on-site lagoon, leachate to the unnamed tributary, and downstream impacts to the unnamed tributary and Flenniken Branch.

In October, 1997, the DSF collected surface water and waste samples at SMS. One sample was collected at the off-site drainage location from the waste pile; analytical results of the sample indicated the presence of ammonia, arsenic, cyanide, lead, and other pollutants. In January, 1998, a Preliminary Assessment Report was completed by DSF for the EPA. EPA subsequently recommended the Site for further investigation. In August, 1998, DSF conducted a Site Investigation to collect information on the presence of any contaminants at the Site and to assist in developing a site-specific preliminary Hazardous Ranking System (HRS) score. Elevated levels of ammonia (192,000 µg/L), arsenic (5 µg/L), lead (4 µg/L), and aluminum (2,160,000 µg/L) were found in surface waters at the Site. Ammonia in particular was found in surface water at a concentration that exceeds the 8,400 ug/L Tennessee 8,400 Criterion Maximum Concentration (CMC) for surface waters. In comparison, background samples of incoming surface waters yielded non-detect results for all analytes that displayed elevated concentrations in downstream samples. Elevated levels of aluminum(135,000mg/kg), PAHs (87.94 mg/kg BaP-Eq), heptachlor (3.11mg/kg), heptachlor epoxide (0.499 mg/kg) and ammonia (5,290 mg/kg) were found in the on-site waste pile. Headspace air samples over the waste pile measured elevated concentrations of ammonia (15,000ppb). Based upon these findings EPA ranked the site as a "higher" priority and requested further assessment.

DSF collected additional samples from the Site in 2001, 2003, and 2004 to monitor ongoing surface water conditions. Analysis of these later samples showed that contaminant concentrations in surface waters leaving the Site had significantly increased for arsenic (56 μg/L), lead (170 μg/L), and aluminum (270,000 ug/L) when compared with levels found in 1997 and 1998. Elevated levels of chlorides (11,700,000μg/L) were found in surface waters leaving the Site that were significantly above background levels (5,000μg/L). Elevated concentrations of ammonia and chlorides, and pH values up to 9.4, were found along the entire length of the unnamed tributary to the Flenniken Branch downstream of the Site.

### 3. Removal Site Evaluation

DSF collected additional samples from the Site in 2001, 2003, and 2004 to monitor ongoing surface water conditions. Analysis of these later samples showed that contaminant concentrations in surface waters leaving the Site had significantly increased for arsenic (56 μg/L), lead (170 μg/L), and aluminum (270,000 ug/L) when compared with levels found in 1997 and 1998. Elevated levels of chlorides (11,700,000μg/L) were found in surface waters leaving the Site that were significantly above background levels (5,000μg/L). Elevated concentrations of ammonia and chlorides, and pH values up to 9.4, were found along the entire length of the unnamed tributary to the Flenniken Branch downstream of the Site.

A Removal Site Evaluation Report was submitted by EPA OSC Jose Negron on October 30, 2007. The report concluded that a time-critical removal is warranted at the Site.

### 4. Physical Location and Site Characteristics

The Smokey Mountain Smelters Site is located at 1508 Maryville Pike (State Route 33) near the Knoxville city limits in Knox County, Tennessee. It lies within one mile of two other Superfund sites: Witherspoon Recycling and Witherspoon Landfill. The total SMS Site is approximately 13 acres in size and includes one large industrial process building, several smaller outlying buildings, and a large waste pile.

The process building is approximately 100 feet wide by 300 feet long, and 50 feet high. It houses two rotary furnaces, one casting furnace, and two 900 cubic-yard (each) piles of aluminum dross. Two baghouses are located outside, at the southwest corner of the building. Portions of the north and east walls of the building have collapsed. A small transformer area is located on the north side of the building along with a set of truck scales and a burned out office or house structure. A spring-fed lagoon measuring approximately 25 feet wide by 100 feet long is located to the southeast of the process building. The depth of this lagoon is unknown. A maintenance building measuring 30 feet wide by 80 feet long is located between the lagoon and the process building. On the western side of the property, several dozen damaged and rusted drums have been disposed. The saltcake waste pile is approximately 50,500 cubic yards in size and covers an area of about 4 acres.

There are heavy residential and moderate commercial developments near the Site with a population density of 1,355 people per square-mile to the west and 3,866 people per square-mile to the east, based on 2000 U.S. Census data. A residential apartment community within 75 feet of the Site houses approximately 560 residents. During an August 1, 2008 Site visit the EPA OSC observed that access controls are not adequate to keep trespassers out of the property. Holes had been cut in the site fence and a path leads from the Site to the nearby apartment complex. This worn path leading to the lagoon and rubber inner tubes (i.e. swim floats) observed in the lagoon indicate that trespassers have been swimming in the contaminated surface waters.

Surface runoff from the Site generally flows to the southwest. Leachate and surface runoff discharges to an unnamed tributary stream, converges with another unnamed tributary, and continues another 1.25 miles to Flenniken Branch. Flenniken Branch flows 0.9 miles into the Knob Creek embayment of the Fort Loudon Reservoir, and then to the Tennessee River. The surface water path passes through neighborhoods, past homes, through yards, and through IC King Park.

**5. Release or Threatened Release Into the Environment of a Hazardous Substance, Pollutant, or Contaminant**

Arsenic, lead, and ammonia are hazardous substances as defined by Sections 101(14) and 101(33) of CERCLA. All these substances have been found at the Site at concentrations that exceed Removal Action Levels or other human health or environmentally based criteria.

i. Releases to Surface Soils at the Site

The waste pile effectively comprises a majority of the land surface at the Site. Arsenic has been found in surface soil up to 59.6 mg/kg, which exceeds the EPA Region 4 RAL of 39 mg/kg. Polychlorinated aromatic hydrocarbons (PAHs) have been detected in surface soils at the Site (87.94 mg/kg BaP-Eq) at a concentration that exceeds the RAL for PAHs of 1.5mg/kg BaP-Eq. Ammonia, was found in surface soils at a concentration of 5,290 mg/kg.

ii. Releases to Surface Water at the Site

Surface waters at the Site consist of a spring-fed lagoon that receives runoff and leachate from the waste pile, and slowly discharges to an intermittent stream that receives additional runoff and leachate from the waste pile and discharges off-Site. Arsenic and lead have both been found in surface waters (56 μg/L and 170 μg/L, respectively) at concentrations exceeding MCLs (10 μg/L and 15 μg/L, respectively). Ammonia has been found in surface waters at concentrations up to 192,000 μg/L, exceeding the Tennessee CMC for ammonia (8,400 μg/L) for non-samlanoid waters. Aluminum and chlorides were found in surface waters (2,160,000 μg/L and 11,700,000 μg/L, respectively) that were significantly above background levels (ND and 5,000 μg/L, respectively).

iii. Release or Threatened Release to Air at the Site

Aluminum dross and salt cake are waste materials left over from the smelting of aluminum ore. Material Safety Data Sheets (MSDSs) for aluminum dross commonly cite reactivity with water to form toxic gases (including ammonia) and heat as a principal hazard associated with such material.

The dross and saltcake wastes disposed on the Site are fully exposed to rainfall. Analytical and qualitative data indicate that ammonia is continuously being produced at SMS and is being released to soil, air, and surface water. An ammonia and cyanide reactivity test confirmed conducted during the 2006 Removal Site Evaluation measured ammonia gas being produced from the waste material at concentrations up to 200,000 ppb. For reference, the RAL for ammonia in residential air recommended by EAP Region 4 Technical Services Section is 417 ppb. Though the test was performed under controlled conditions, it demonstrates that wastes disposed at the Site are capable of generating substantial amounts of ammonia gas. This finding coupled with measurements an airborne ammonia measurement of 15,000 ppb made in 1997 and citizen complaints of air emissions from the Site dating back to the 1980s indicates that ammonia is continuously being generated at the Site and released to the atmosphere. Such air releases will likely continue into the foreseeable future unless some action is taken.

## 6. NPL Status

In August 1998, DSF conducted a Site Investigation to collect information on the presence of any contaminants at the Site and to assist in developing a Site-specific preliminary Hazardous Ranking System (HRS) score to determine if the Site should be included in the National Priorities List (NPL). In a letter to the State of Tennessee dated November, 1998, EPA ranked the site as a "higher" priority and requested further assessment. The Site is not currently listed on the NPL.

7. **Maps, Pictures, and Other Graphic Representations**

The following figures are attached:

- Photographic Log (Appendix B)
- Tables 1 through 14 from the "Trip Report, Smokey Mountain Smelters Site", July 13, 2007, *U.S. EPA Work Assignment No. 0-228, Lockheed Martin Work Order No. EAC00228, U.S. EPA Contract No. EP-C-04-032* (Appendix C)

## B. Other Actions to Date

### 1. Previous Actions

Multiple sampling events were conducted between 1997 and 2006 by DSF and EPA at the Site to characterize the composition and contaminants in the waste piles, the raw material piles, the on-Site lagoon, leachate to the unnamed tributary, and downstream impacts of the unnamed tributary and the Flenniken Branch. The results of these investigations are summarized in previous sections of this Action Memorandum.

### 2. Current Actions

No current actions are taking place at the Site.

## C. State and Local Authorities Roles

### 1. State and Local Actions to Date

The State of Tennessee referred this Site to EPA's Emergency Response and Removal Branch (ERRB) in June, 2006, and has requested EPA's assistance with the removal of contaminants and pollutants. EPA has been coordinating with the Tennessee Department of Environmental Conservation (TDEC) to share information about the Site and will continue to coordinate efforts during the time-critical removal action.

### 2. Potential for Continued State and Local Response

At present, TDEC has no plans to take further action at the Site due to lack of funding resources. No local agency has been requested to respond to the Site.

## III. THREATS TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT, AND STATUTORY AND REGULATORY AUTHORITIES

**Threats to Public Health or Welfare**

EPA Region 4 ERRB has determined that the Site meets the requirements for initiating a removal action found in Section 300.415(b)(2) of the NCP.

Section 300.415(b)(2)(i) – *"Actual or potential exposure to nearby human populations from hazardous substances or pollutants or contaminants"*: The Site is not secured to preclude public access. The facility is located within 75 feet of a residential apartment community with a population over 560. Visual observations made during previous investigations, including holes cut into fencing, worn foot paths across the property, and inner tubes (i.e. swim floats) in the on-site pond/lagoon, provide ample evidence that trespassers frequent the Site. As previously indicated, aluminum dross and salt cake are materials that react with water to produce heat and toxic gases such as ammonia. The dross piles at the Site are completely exposed to the elements and are totally unsecured to preclude public access. Analytical and qualitative data gathered at the Site by the State and EPA suggest that ammonia is continuously being produced at SMS and is being released to soil, air, and surface water. Anyone entering the Site or residing within close proximity to the Site may be potentially exposed to hazardous concentrations of ammonia through inhalation (for airborne releases) or through ingestion or direct contact (for soil, waste, and surface water). Those coming into contact with leachate either on-site or migrating from the Site may be exposed to hazardous concentrations of arsenic and lead. Wastes at the Site are exposed to the elements, resulting in releases of harmful gases and leachate to surface waters. Aluminum dross and saltcake at the Site are water reactive; the reaction produces heat, ammonia gas (above the RAL).

Section 300.415(b)(2)(v) – *"Weather conditions that may cause hazardous substances or pollutants or contaminants to migrate or be released"*: The facility is abandoned and unsecured. The process building is structurally unstable and is collapsing. Aluminum dross piles inside the building, which are comparatively more reactive than the waste pile outside, will be continually exposed to rain and runoff as the building collapses. During rain events the waste piles are exposed to water which is causing some of the waste to react and release ammonia gas. The smell of ammonia has been regularly documented by TDEC and EPA, has been measured at 15,000ppb (above RAL) during an investigation in 1997. During rain events, leachate from exposed waste releases hazardous substances, such as ammonia, onto the ground. Leachate from aluminum waste stockpiles exposed to water shows increased concentrations of hazardous substances.

Section 300.415(b)(2)(vi) – *"Threat of fire or explosion"*: Aluminum dross and saltcake are known to be exothermically reactive when exposed to water. Landfills that have accepted these wastes in the past have periodically reported subterranean fires during leachate recirculation. If a large amount of water were to be introduced to an unreacted portion of aluminum dross stored in the process building at the Site, such as during a severe weather event may result in a fire and could result in the release of hazardous substances to the air.

Section 300.415(b)(2)(vii) – *"The availability of other appropriate Federal or State response mechanisms to respond to the release"*: There is no other Federal or State mechanism to respond to the release. State of Tennessee has requested EPA's assistance because they do not have the financial resources necessary to fund the removal.

## IV. ENDANGERMENT DETERMINATION

Actual or threatened releases of hazardous substances from this Site, if not addressed by implementing the response action selected in this Action Memorandum, may present and imminent and substantial endangerment to public health welfare, or the environment.

## V. PROPOSED ACTIONS AND ESTIMATED COSTS

### A. Proposed Actions

#### 1. Proposed Action Description

Immediate steps must be taken to secure the Site in order to reduce direct exposure pathways to nearby human populations, and to evaluate further steps to mitigate potential off-Site migration of hazardous substances, pollutants, and contaminants.

The removal action will meet the following objectives, taking any reasonable and appropriate action not explicitly described herein to achieve them:

i. Install security measures to prohibit access to the Site by unauthorized personnel; and,

ii. Investigate the nature and extent of waste materials dumped at the Site, and hazardous substances, pollutants, and contaminants being released from the Site, including control measures to prevent future releases.

#### 2. Contribution to Remedial Performance

The proposed removal action is warranted to address the threats discussed in Section III that meet the NCP Section 300.415(b)(2) removal criteria. The removal action proposed in this Action Memorandum will be consistent with any potential remedial action.

#### 3. Description of Alternative Technologies

An evaluation of alternative technologies will be conducted as part of the investigation being proposed in this removal.

### 4. Engineering Evaluation/Cost Analysis (EE/CA)

This proposed action is time-critical and does not require and EE/CA.

### 5. Applicable or Relevant and Appropriate Requirements (ARARs)

On-site removal activities conducted under CERCLA are required to attain ARARs to extent practical considering the exigencies of the situation. Off-site removal activities need only comply with all applicable Federal and State laws, unless there is an emergency. All waste transferred off-site will follow the CERCLA Off-Site Rule. A letter to TDEC requesting ARARs was sent in September, 2008, and all requirements provided by TDEC will be adhered to as practicable in accordance with Section 300.415(j) of the NCP.

### 6. Project Schedule

Response actions at the Site will be initiated within six months of the approval of this Action Memorandum. Without any unexpected delays, all actions are expected to be completed within ten months of mobilization.

## B. Estimated Costs

An independent government cost estimate of the removal action project ceiling was prepared using rates from the Emergency and Rapid Response Services (ERRS) contract and the Superfund Technical Assessment and Response Team (START) contract.

| | | |
|---|---|---|
| Extramural Costs | | |
| Regional Allowance Costs | | |
| ERRS Contractor | $ | 52,000 |
| | | |
| Non Regional Allowance Costs | | |
| START Contractor | $ | 51,000 |
| Bureau of Reclamation or REAC | $ | 150,000 |
| CLP | $ | 60,000 |
| | | |
| Subtotal, Extramural Costs | $ | 313,000 |
| 20% Contingency | $ | 62,600 |
| **TOTAL SITE CEILING** | **$** | **375,600** |

## VI. EXPECTED CHANGE IN THE SITUATION SHOULD ACTION BE DELAYED OR NOT TAKEN

Unless action is taken, the Site will continue to be unsecured to preclude human access and potential exposure to ammonia gases, contaminated surface waters, and contaminated surface soils. Off-site migration of contaminants will continue unabated. Further degradation of Site buildings will lead to further exposure of waste materials to the elements and greater potential for release of hazardous substances.

## VII. OUTSTANDING POLICY ISSUES

No outstanding policy issues have been identified at this time.

## VIII. ENFORCEMENT

(b) (7)(A)

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[1] Direct Costs include direct extramural costs and direct intramural costs. Indirect costs are calculated based on an estimated indirect cost rate expressed as a percentage of site-specific direct costs, consistent with the full cost accounting methodology effective October 2, 2000. These estimates do not include pre-judgment interest, do not take into account other enforcement costs, including Department of Justice costs, and may be adjusted during the course of a removal action. The estimates are for illustrative purposes only and their use is not intended to create any rights for responsible parties. Neither the lack of a total cost estimate nor deviation of actual total costs from this estimate will affect the United States' right to cost recovery.

## IX. RECOMMENTATION

This decision document represents the selected removal action for the Smokey Mountain Smelters, Knox County, Tennessee, developed in accordance with CERCLA as amended, and not inconsistent with the NCP. This decision is based on the Administrative Record for the Site.

Conditions at the Site meet the NCP Section 300.415(b)(2) criteria for a removal and I recommend your approval for the proposed action. The total project ceiling, if approved, will be \$375,600. Of this, an estimated \$52,000 comes from the Regional Removal Allowance.

Approval: ______________________ Date: 9/15/08
Franklin E. Hill, Director
Superfund Division

Disapproval: ______________________ Date: __________
Franklin E. Hill, Director
Superfund Division

Attachments

# ATTACHMENT A
# ENFORCEMENT ADDENDUM

(b) (7)(A)

(b) (7)(A)

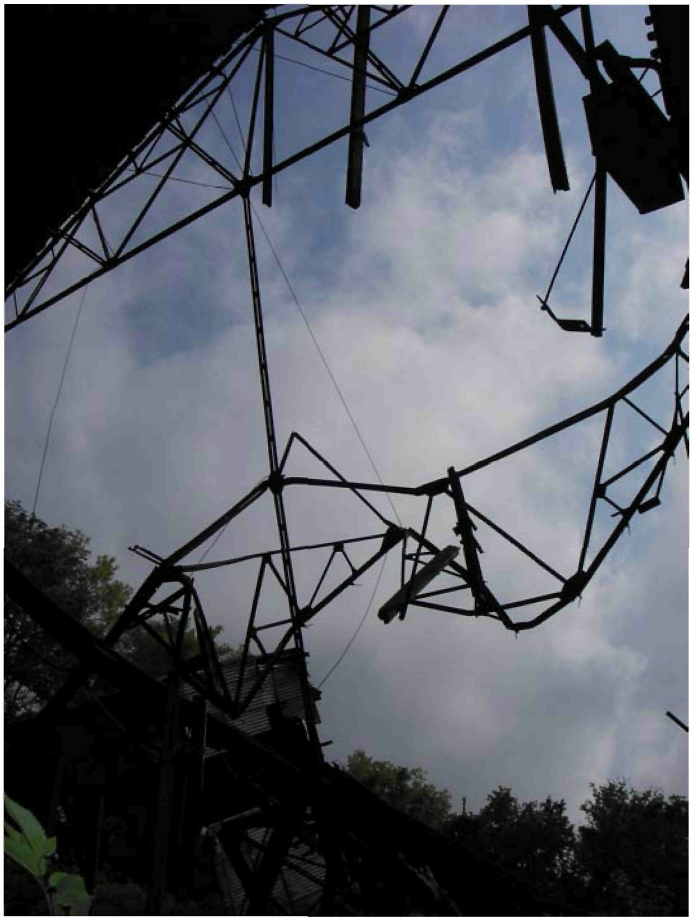
# ATTACHMENT B
# PHOTO LOG

August, 2008
View of south wall of main process building.  TDEC representative can be seen in bottom left corner of photo.

August, 2008
View of south wall of main process building from high mound of waste pile. 1/3 of Eastern portion of process building has collapsed.  SW corner wall is missing.

August, 2008
View of ceiling of main process building.  Steel beam support with steel trusses and wooden roof.  Roof is failing and wood falls periodically.

August, 2008
Unidentified machine/equipment in process building.



August, 2008
View of truss at point where collapsed portion of process building meets the still-standing portion. Truss shown is suspended 20-30' in air

August, 2008
Small dross/saltcake pile in process building.

August, 2008
Air ducts from rotary furnace to baghouses. Graffiti shows that the process building is regularly visited by trespassers.

August, 2008
Furnace in process building; door remains open, with aluminum dusts and fly ash inside.

August, 2008
Molten aluminum slide emitting from furnace for casting ingots.

August, 2008
Saltcake troughs in process building.

August, 2008
Rotary kiln furnace in process building, filled with dross residue.

August, 2008
Small saltcake pile in process building.

August, 2008
Large dross pile in southwest corner of process building; approximately 900 cubic yards total volume.

August, 2008
Bottom of western baghouse, with used socks and large bins filled with baghouse dusts.

August, 2008
Excavation of saltcake pile to measure average density.  Saltcake is powdery with small particles and a silty-sand texture.

August, 2008
Closeup view of saltcake in waste pile.


August, 2008
Unused dross or slag disposed in waste pile.


August, 2008
Surface view of saltcake in waste pile.

August, 2008
Excavation of saltcake in waste pile at western edge.  Vegetation is growing on organic matter that is decomposing on the waste pile, no roots enter the saltcake.

August, 2008
Another view of excavation of saltcake in waste pile at western edge. Vegetation is growing on organic matter that is decomposing on the waste pile, no roots enter the saltcake.

August, 2008
Excavation of saltcake in waste pile at northern edge. As seen on western edge, vegetation is growing on organic matter and no roots enter the saltcake.

August, 2008
Leachate from the waste pile at western runoff point (low rain volume).

August, 2008
Impact point of leachate at intersection with intermittent stream (grey water at left) with contaminated water (brown water at right) flowing to Flenniken Branch (low rain volume).

August, 2008
Worn path from trespassers entering from fence breach.

August, 2008
Worn path from trespassers entering from fence breach; shopping cart brought to Site seen in upper right of photo.

August, 2008
Transformer box dragged from main process building to fence breach.
Copper wiring and other devices removed; may have contained lead, mercury, and/or PCB oils.

August, 2008
Fence breach as seen from Site, facing south. Apartment complex located adjacent to the Site beginning on the south side of railroad line shown behind fence.

August, 2008
Fence breach as seen from railroad line, facing north. Apartment complex located adjacent to the Site beginning on the south side of railroad line.

August, 2008
Second fence breach along eastern side.

August, 2008
Vegetation overgrowth of fence renders it ineffective and unnoticed.

# ATTACHMENT C
# TABLES

TABLE 1
RADIATION VALUES AT SELECTED LOCATIONS
SMOKEY MOUNAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | RADIATION VALUES | | |
|---|---|---|---|
| | Alpha | Beta | Gamma |
| LOCATION | cps | uR/hr | uR/hr |
| Background 1 | NM | 47 | 8 |
| Background 2 | NM | 70/63 | 9 |
| Discarded Bag Filters (M1) | 24 to 26 | 69 | 15 |
| Eastern furnace (M2) | 60 to 80 | 100 | 50 |
| Baghouse area (M3) | NM | 50 | 9 |
| Building floor (M4) | 18 | NM | NM |
| Grid Location 80 S, 150 W | 20 | 69 | 6 |
| Grid Location 40 S, 200 W | 18 | 71 | 5 |
| Grid Location 110 S, 200 W | 19 | 86/70 | 5 |
| Grid Location 40 S, 450 W | 19 | 79/68 | 6 |

cps = counts/second
uR/hr = microroentgens/hour
NM = not measured

TABLE 2
DIOXIN/FURAN CONCENTRATIONS IN SEDIMENT/SOIL
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | Location - October 2006 Mobilization | | | | |
|---|---|---|---|---|---|
| | Baghouse Dust | Eastern Furnace | Bldg, upper level | Eastern Stack* | Western Stack* |
| Sample No. | 04142 (Diox-1) | 04143 (Diox-2) | 04144 (Diox-3) | 04145 (Diox-4) | 04146 (Diox-5) |
| Analyte | | | | | |
| Total TCDDs | 2,240 | 21.8 | 5.52 | 805 | 5,000 |
| Total PeCDDs | 2,440 | 26.9 | 7.01 | 1,130 | 5,650 |
| Total HxCDDs | 2,670 | 55.9 | 11.6 | 1,620 | 10,900 |
| Total HpCDDs | 941 | 39.2 | 10.1 | 930 | 4,980 |
| Total TCDFs | 7,190 | 49.3 | 23.6 | 8,940 | 141,000 |
| Total PeCDFs | 5,700 | 54.7 | 21.2 | 9,470 | 43,100 |
| Total HxCDFs | 2,550 | 42.5 | 15.4 | 4,480 | 62,200 |
| Total HPCDFs | 1,000 | 34.5 | 9.95 | 1,580 | 21,700 |
| WHO TEQ | 453 | 6.57 | 2.33 | 854 | 6,820 |
| | Concentration in picograms/gram | | | | |

| | Location - December 2006 Mobilization | | | | |
|---|---|---|---|---|---|
| | SB-24 | Inside Pile | Boiler Dust East | Boiler Dust West | Inside Stack |
| Sample No. | 182-0066 | 182-0068 | 182-0069 | 182-0070 | 182-0071 |
| Analyte | | | | | |
| Total TCDDs | 406 | 31.1 | 163 | 149 | 594 |
| Total PeCDDs | 518 | 34.4 | 190 | 932 | 1,240 |
| Total HxCDDs | 1,120 | 46.7 | 292 | 95 | 3,020 |
| Total HpCDDs | 622 | 30.9 | 309 | 90.8 | 2,370 |
| Total TCDFs | 9,030 | 77.7 | 613 | 174 | 2,770 |
| Total PeCDFs | 4,190 J | 63.4 | 662 | 202 | 4,460 |
| Total HxCDFs | 3,920 | 40.6 | 593 | 143 | 4,760 |
| Total HPCDFs | 1,370 | 30.1 | 651 | 86.9 | 3,250 |
| WHO TEQ | 312 | 6.72 | 69.6 | 20.7 | 567 |
| | Concentration in picograms/gram | | | | |

* outside stacks

TABLE 3
RESULTS OF ASBESTOS AND LEAD ANALYSES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| ASBESTOS SAMPLES | | |
|---|---|---|
| Material | Sample No. | Result |
| waste pile material at 30 N, 100 W* | ASB-1 | non-fibrous (mostly glass) |
| waste pile material at 60 S, 280 W* | ASB-2 | non-fibrous (mostly glass) |
| not collected | ASB-3 | NA |
| furnace, middle of trough residual waste | ASB-4 | non-fibrous |
| gray corregated sheeting | ASB-5 | 45% fibrous chrysotile |
| green corregated sheeting | ASB-6 | non-fibrous |
| furnace, end of trough residual waste | ASB-7 | non-fibrous |
| "cement" board fragment | ASB-8 | 50% fibrous chrysotile |

* fibrous appearing

| LEAD SAMPLES | | |
|---|---|---|
| Location | Sample No. | Result - milligrams/kilogram |
| paint chip off western furnace | PC-1 | 4,840 |
| paint chip off eastern furnace | PC-2 | 60,700 |

TABLE 4
RESULTS OF INORGANIC ANALYSES - SURFACE WATER, SPRING AND MONITOR WELL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | Alkalinity as CaCO3 | Chloride | Cyanide | Fluoride | Nitrogen, Ammonia | Nitrogen, Nitrate | Nitrogen, Nitrate + Nitrite | Nitrogen, Nitrite | Phosphorus | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|---|
| | OCTOBER 2006 MOBILIZATION | | | | | | | | | |
| Background* | 154 | 3.70 | <0.01 | <0.10 | NS | 0.35 | 0.35 | <0.01 | <0.05 | 181 |
| Leachate Seep | 1,260 | 11,500 | <0.01 | 215 | NS | 1.4 | 2 | 0.64 | 4.6 | 20,400 |
| Stream** | 2,180 | 11,000 | <0.01 | 202 | NS | <0.20 | 0.58 | 0.67 | 4.2 | 20,000 |
| Pond | 127 | 447 | <0.01 | 9.6 | NS | 2.1 | 2.3 | 2.1 | 0.15 | 1,060 |
| Mayo Spring | 229 | 1,760 | <0.01 | 1.3 | NS | 6.4 | 7.3 | 0.86 | 0.08 | 3,650 |
| Spring 2 | <5.0 | 330 | <0.01 | NA | NS | 1.8 | 1.8 | <0.01 | 0.37 | 998 |
| | milligrams/liter | | | | | | | | | |

| LOCATION | Alkalinity as CaCO3 | Chloride | Cyanide | Fluoride | Nitrogen, Ammonia | Nitrogen, Nitrate | Nitrogen, Nitrate + Nitrite | Nitrogen, Nitrite | Phosphorus | Total Dissolved Solids |
|---|---|---|---|---|---|---|---|---|---|---|
| | DECEMBER 2006 MOBILIZATION | | | | | | | | | |
| Background* | 148 | 3.60 | U | U | U | 0.578 | 0.578 | U | U | 156 |
| Leachate Seep | 3,890 | 10,500 | 0.011 | 262 | 253 | U J | 0.272 | 0.317 | 1.82 | 15,900 |
| Stream** | 2,220 | 10,400 | 0.012 | 256 | 241 | U | 0.651 | 0.903 | 3.87 | 16,500 |
| Pond | 119 | 118 | U | 5.95 J | U | U | U | U | 0.197 | 405 |
| Mayo Spring | 224 | 687 | U | 2.83 | U | 5.7 | 5.84 | 0.138 | 0.21 | 1,430 |
| Spring 2 | 833 | 307 | U | 0.117 | U | 2.14 | 2.14 | U | 0.054 | 829 |
| TW-1 | 538 | 1,620 | U | 122 | 3.73 | 108 | 112 | 3.22 | 3.74 | 3,460 |
| TW-2 | NA | NA | NA | NA | 378 | U | U | U | 0.430 | NA |
| TW-5 | 1,260 | 22,700 | 0.016 | 256 | 534 | 0.789 | 0.836 | 0.047 | 2.83 | 32,800 |
| TW-7 | 1,760 | 5,500 | 0.073 | 479 J | 164 | U | U | U | 3.5 | 9,380 |
| | milligrams/liter | | | | | | | | | |

U = non-detect NA = not analyzed
J = estimated NS = not sampled
* Stream background, upgradient from site
** Downgradient from site
TW - temporary monitor well

TABLE 5
RESULTS OF VOC ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | | micrograms/kilogram | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | DEPTH* | Chloromethane | Trichlorofluoromethan | Acetone | Methylene Chloride | Carbon Disulfide | 2-Butanone | 1,1,1-Trichloroethane | Trichloroethene | Tetrachloroethene | Ethylbenzene | p&m-Xylene | o-Xylene | 2-Chlorotoluene | 1,2,4-Trimethylbenze | p-isopropyltoluene | Naphthelene |
| SB-01 | 0 - 5 | U | U | U | 2.50 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 7 - 8 | U | U | U | 6.62 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | 10.5 J | 1.63 J | 4.76 J | U | U | U | U | U | U | U | U | U | U | U |
| SB-02 | 0 - 5 | U | U | 14.0 J | U | 4.88 J | 2.16 J | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 45.5 | 11.7 J | 4.00 J | 5.00 J | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | 256 | 11.4 | 5.66 J | 39.8 J | 3.58 J | 3.19 J | U | 3.01 J | 7.78 J | 3.86 J | U | 3.49 J | 6.48 J | 6.96 |
| SB-03 | 0 - 5 | U | U | U | 6.57 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | 4.64 J | U | U | 2.28 J | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | 4.46 J | 7.10 J | U | U | U | U | U | U | U | U | U | U | 7.19 J |
| | 15 - 20 | U | U | 615 J | 8.36 | U | 64.1 | U | U | 1.85 J | 4.10 J | 12.5 J | 7.45 | U | 2.86 J | 3.62 | 9.86 |
| SB-04 | 0 - 5 | U | U | 8.71 J | 8.15 | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 21.5 J | 6.51 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | 7.41 J | 12.8 | U | U | U | U | U | U | U | U | U | U | U | U |
| | 15 - 20 | U | U | 310 J | U | U | 21.0 | U | U | U | U | U | U | U | U | U | U |
| | 18 - 19 | U | U | 429 J | U | 9.47 | 28.0 | U | U | U | 2.95 J | 11.0 J | 4.81 J | U | 5.47 J | U | 8.96 |
| SB-05 | 0 - 5 | U | U | U | 6.32 J | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-06 | 0 - 5 | U | U | 5.40 J | 6.15 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 113 | 4.57 J | U | 21.3 | U | 3.79 J | U | U | 4.39 J | 1.73 J | U | U | U | U |
| | 10 - 15 | U | U | 117 | 2.64 J | U | 25.1 | U | 2.12 J | U | U | 4.88 J | 2.35 J | U | U | 3.73 J | 2.77 J |
| | 15 - 20 | U | U | 65.0 | 4.88 J | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-07 | 0 - 5 | U | U | 180 | 23.3 | 5.38 J | 47.4 | 5.97 J | 6.10 J | 11.9 | U | 2.42 J | U | U | U | U | 9.62 J |
| | 5 - 10 | U | U | 64.0 | 2.49 J | U | 17.7 | U | U | 4.79 J | U | U | U | U | U | U | 11.3 |
| | 10 - 15 | U | U | 109 | 3.51 J | U | 20.3 J | U | U | U | U | U | U | U | U | U | U |
| SB-08 | 0 - 5 | U | 7.91 | U | U | U | U | U | 2.51 J | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | 8.17 | 202 | 18.4 | 6.41 | 41.6 J | 3.09 J | 2.76 J | U | U | U | U | U | U | 2.00 J | U |
| | 10 - 15 | U | U | 97.4 | 17.1 | U | 2.59 J | U | 4.32 J | U | U | U | U | U | U | U | U |
| SB-09 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 344 J | 9.44 | 4.08 J | 75.1 | 2.40 J | 1.88 J | U | 6.75 | 14.1 | 10.5 | U | 8.84 | U | 12.7 |

TABLE 5 (CONTINUED)
RESULTS OF VOC ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | | micrograms/kilogram | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Chloromethane | Trichlorofluoromethan | Acetone | Methylene Chloride | Carbon Disulfide | 2-Butanone | 1,1,1-Trichloroethane | Trichloroethene | Tetrachloroethene | Ethylbenzene | p&m-Xylene | o-Xylene | 2-Chlorotoluene | 1,2,4-Trimethylbenze | p-isopropyltoluene | Naphthelene |
| LOCATION | DEPTH* | | | | | | | | | | | | | | | | |
| SB-10 | 0 - 5 | U | U | U | U | U | U | U | 1.82 J | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 6.66 J | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | 4.12 J | U | 328 J | 5.67 J | U | 88.1 J | U | U | U | 5.33 J | 19.9 | 7.72 | U | 2.35 J | 2.79 J | 7.29 |
| SB-12 | 0- 5 | U | U | U | 9.05 | U | U | U | 1.75 J | 4.38 J | U | U | U | U | U | U | U |
| SB-13 | 0 - 5 | U | U | 102 J | 36.1 | 10.3 | 12.1 J | 4.13 J | 5.22 J | U | U | U | U | U | U | U | 8.11 |
| | 5 - 10 | U | U | 256 | 3.97 J | 7.12 | 54.0 J | U | U | U | U | U | U | U | U | 45.1 | U |
| SB-14 | 0 - 5 | U | 7.87 | U | 2.72 J | U | U | U | U | U | 4.18 J | 26.7 | 7.07 | U | U | 3.42 J | 3.37 J |
| SB-15 | 0- 5 | U | U | U | 1.95 J | 6.91 | U | U | U | U | U | U | U | U | U | U | U |
| SB-16 | 0 - 5 | U | 8.88 | U | 7.27 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 127 | 4.55 J | 6.30 J | 29.5 J | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | 133 | 5.79 J | 5.64 J | 23.9 | U | U | U | U | U | U | U | U | U | U |
| | 15 - 20 | U | 7.35 | 215 | 11.0 J | 18.0 | 47.4 | 2.02 J | U | U | 2.76 J | 7.49 J | 4.93 J | U | 2.68 J | 18.5 | 5.32 J |
| SB-17 | 0 - 3 | U | 9.93 | 186 | 9.37 J | 6.49 J | 36.4 | 6.21 J | 4.73 J | 4.78 J | 2.73 J | 9.55 J | 5.63 J | 61.1 | 7.48 | U | 24.2 |
| SB-18 | 0 - 5 | U | 8.59 | U | 4.15 J | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | 154 | U | U | 32.2 | U | U | U | U | U | U | U | U | U | 2.27 J |
| | 10 - 15 | 213 J | U | 255 | U | 5.20 J | 33.5 | U | U | U | U | U | U | U | U | U | U |
| SB-19 | 0 - 5 | U | U | 145 | 2.15 J | 4.54 J | 22.1 | U | 1.77 J | 18.3 J | 4.47 J | 14.5 | 4.96 J | U | U | 1.89 J | U |
| SB-20 | 0 - 5 | U | U | U | U | U | U | U | 3.49 J | 114 J | U | U | U | U | U | U | U |
| SB-21 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | 9.03 | 364 J | 9.84 J | 10.6 | 81.9 | 2.28 J | U | U | U | U | U | U | U | U | U |
| SB-22 | 0 - 2 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-23 | 0 - 2 | U | 9.3 | U | 8.98 J | U | U | 1.91 J | U | U | U | U | U | U | U | U | U |
| In Pile | | 93.4 J | U | 119 | U | U | 14.8 J | U | U | U | U | U | U | U | U | U | U |

* feet below ground surface
J = estimated value
U = non-detect

TABLE 6
RESULTS OF BNA ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | | micrograms/kilogram | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | DEPTH* | Phenol | Napthalene | 2-Methylnapthalene | Acenaphthene | Dibenzofuran | Fluorene | Pentachlorophenol | Phenanthrene | Anthracene | Carbazole | Fluoranthene | Pyrene | Butylbenzyphthalate | Benzo(a)anthracene | Chrysene | Bis(2-ethylhexyl)phthalate | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Benzo(a)pyrene | Indeno(1,2,3-cd)pyrene | Dibenzo(a,h)anthracene | Benzo(g,h,i)perylene |
| SB-01 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 7 - 8 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | U | U | U | U | U | U | 172 J | 149 J | U | U | 119 J | U | U | U | U | U | U | U |
| SB-02 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | 270 J | U | U | U | U | U | 317 J | 756 | U | U | 1,060 | 830 | U | 353 J | 451 J | 360 J | 518 | 143 J | 282 J | 150 J | U | U |
| SB-03 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | 154 J | 143 J | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 15 - 20 | U | 121 J | U | U | U | U | U | 838 | 153 J | U | 1,890 | 1,560 | U | 1,050 | 1,630 | 210 J | 2,580 | 723 | 955 | 884 | 216 J | 959 |
| SB-04 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | U | U | U | 116 J | U | U | 526 | 517 | U | 301 J | 416 J | U | 424 J | 383 J | 436 J | 299 J | U | 354 J |
| | 15 - 20 | U | U | U | U | U | U | U | U | U | U | 115 J | 98.4 J | U | U | U | U | U | U | U | U | U | U |
| | 18 - 19 | 191 J | 150 J | 140 J | U | 142 J | 159 J | U | 2,370 | 689 | 472 | 3,940 | 3,870 | U | 1,940 | 3,410 | 704 | 2,700 | 2,360 | 2,380 | 1,850 | U | 2,250 |
| SB-05 | 0 - 5 | U | U | U | U | U | 126 J | 128 J | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-06 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | 230 J | U | U | 542 J | 452 J | U | 310 J | 617 J | U | 591 J | 548 J | 352 J | 491 J | U | 618 J |
| | 10 - 15 | U J | U J | U J | U | U J | U J | U J | 401 J | U J | U J | 832 | 649 | U | 365 J | 785 | 128 J | 506 | 513 | 275 J | 326 J | U J | 374 J |
| | 15 - 20 | U | U | U | U | U | U | U | U | U | U | 120 J | U | U | | | U | U | U | U | U | U | U |
| SB-07 | 0 - 5 | U | 12,700 | 5,290 | 5,030 | 2,310 J | 4,250 | U | 17,900 | 5,500 | 2,190 J | 18,900 | 13,500 | U | 6,210 | 7,240 | U | 5,500 | 5,060 | 5,600 | 3,350 | 1,350 | 3,820 |
| | 5 - 10 | U | 1,340 J | 979 J | U | U | U | U | 1,030 J | U | U | 1,760 J | 1,490 J | U | 1090 J | 1,360 J | U | 1,420 J | 1,300 J | 1,410 J | 1,040 J | U | 1,250 J |
| | 10 - 15 | U | U | U | U | U | U | U | U | U | U | 121 J | U | U | U | U | U | U | U | U | U | U | U |
| SB-08 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 147 J | 152 J | U | 149 J | U | 190 J |
| | 5 - 10 | | 1,460 J | 749 J | 2,310 J | 1,340 J | 2,640 | U | 22,500 | 6,710 | 4,420 | 34,300 | 26,000 | 177,000 | 15,100 | 16,700 | 1,020 J | 13,200 | 11,800 | 13,900 | 8,140 | U | 8,970 |
| | 10 - 15 | 8,570 | 5,930 | 8,820 | U | 1,630 J | U | R | 4,200 | U | U | 3,050 | 2,590 J | U | 1,110 J | 1,790 J | 669 J | 1,290 J | 1,050 J | 1,260 J | 821 J | U | 1,080 J |
| SB-09 | 0 - 5 | U | U | U | U | U | U | U | 305 J | U | U | 489 J | 415 J | U | 215 J | 318 J | U | 259 J | 261 J | 234 J | 164 J | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | 1,130 | 213 J | 174 J | 1,970 | 1,700 | U | 1,070 | 1,350 | 149 J | 1,260 | 1,090 | 1,300 | 820 | 190 J | 890 |
| SB-10 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | 144 J | U | U | 178 J | 164 J | U | U | 121 J | 1,310 | U | U | U | U | U | U |
| | 10 - 15 | 216 J | U | 132 J | 110 J | U | U | U | 1,080 | 240 J | 188 J | 1,780 | 1,580 | U | 882 | 1,230 | 590 | 1,040 | 929 | 1,040 | 648 | 263 J | 759 |

TABLE 6 (CONTINUED)
RESULTS OF BNA ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | | micrograms/kilogram | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOCATION | DEPTH* | Phenol | Napthalene | 2-Methylnapthalene | Acenaphthene | Dibenzofuran | Fluorene | Pentachlorophenol | Phenanthrene | Anthracene | Carbazole | Fluoranthene | Pyrene | Butylbenzyphthalate | Benzo(a)anthracene | Chrysene | Bis(2-ethylhexyl)phthalate | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Benzo(a)pyrene | Indeno(1,2,3-cd)pyrene | Dibenzo(a,h)anthracene | Benzo(g,h,I)perylene |
| SB-12 | 0 - 5 | U | U | U | U | U | U | R | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-13 | 0 - 5 | U | U | U | U | U | U | U | 753 | 142 J | 220 J | 1,950 | 1,700 | 11,000 | 953 | 1,650 | 143 J | 1,820 | 1,510 | 1,010 | 1,620 | U | 2,070 |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | UU | U | U | U | U | U | U | U | U | U | U |
| SB-14 | 0 - 5 | U | U | U | U | U | U | U | 151 J | U | U | 415 J | 406 J | U | 246 J | 420 J | U | 577 | 537 | 364 J | 672 | U | 834 |
| SB-15 | 0- 5 | U | U | U | U | U | U | U | 137 J | U | U | 251 J | 260 J | 110 J | 163 J | 313 J | 127 J | 626 | 120 J | 201 J | 209 J | U | 264 J |
| SB-16 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | 144 J | U | U | U | 116 J | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 15 - 20 | 384 J | U | U | 112 J | U | 127 J | U | 1,490 | 249 J | 316 J | 2,430 | 2,070 | U | 908 | 1,320 | 25,500 | 1,140 | 1,100 | 1,100 | 784 | U | 949 |
| SB-17 | 0 - 3 | 123 J | U | U | U | U | U | U | U | 576 | 111 J | 712 | 688 | 704 | 369 J | 550 | 401 J | 511 | 392 J | 476 | U | U | U |
| SB-18 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | 222 J | 218 J | U | 162 J | 287 J | U | 532 | 135 J | 246 J | 369 J | U | 521 |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | U | 117 J | U | U | 444 J | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | U | U | U | 123 J | U | U | 192 J | 167 J | | | 131 J | | 119 J | 129 J | U | U | U | 125 J |
| SB-19 | 0 - 5 | U | U | U | U | U | 643 J | U | 5,780 | 2,080 J | 1,180 J | 12,000 | 11,900 | 2,590 J | 5,720 | 7,600 | 1,350 J | 11,500 | 3,930 | 6,680 | 3,280 | 1130 J | 4,130 |
| SB-20 | 0 - 5 | U | U | U | U | U | 133 J | U | 1,050 | 310 J | 197 J | 1,420 | 1,130 | 197 J | 585 | 679 | 168 J | 965 | 262 J | 551 | 221 J | U | 291 J |
| SB-21 | 0 - 5 | U | U | U | U | U | U | U | 113 J | U | U | 287 J | 268 J | U | 167 J | 267 J | 109 J | 382 J | 108 J | 191 J | 127 J | U | 154 J |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-22 | 0 - 2 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| SB-23 | 0 - 2 | U | U | U | U | U | U | U | 123 J | U | U | 275 J | 275 J | U | 197 J | 310 J | U | 389 J | 375 J | 302 J | 394 J | U | 535 |
| SB-24 | 0 - 0.3 | U | U | U | U | U | U | U | 451 J | 196 J | U | 1,400 | 1,680 | U | U | 4,710 | 531 J | 9,030 | 14,400 | 5,100 | 15,300 | 501 J | 19,300 |
| Inside Pile | | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Furnace Dust E | | U | U | U | U | U | U | U | U | U | U | 131 J | 131 J | U | U | U | 820 | U | U | U | U | U | U |
| Furnace Dust W | | U | U | U | U | U | U | U | 126 J | U | U | U | U | U | U | U | 618 | U | U | U | U | U | U |
| Inside Stack | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |

* feet below ground surface
J = estimated value
R = rejected
U = non-detect

TABLE 7
RESULTS OF PESTICIDE/PCB ANALYSES - SOIL SAMPLES
DECEMBER 2006 MOBILIZATION
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | DEPTH* | d-BHC | Heptachlor | Heptachlor Epoxide | Aldrin | g-Chlordane | a-Chlordane | p,p'-DDE | Dieldrin | p,p'-DDD | p,p'-DDT | Endosulfan Sulfate | Endrin Ketone | Aroclor 1232 | Aroclor 1260 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-01 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 7 - 8 | R | R | R | R | R | R | R | R | R | R | R | R | R | R |
| | 10 - 15 | U | U | U | U | 4.09 J | U | 1.37 J | 71.0 | U | U | U | U | U | U |
| SB-02 | 0 - 5 | U | U | U | U | U | U | U | 1.70 J | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | 5.56 | U | U | U | U | U | U |
| | 10 - 15 | 5.25 | U | U | U | U | U | 14.6 | U | U | U | U | U | 627 | 1,020 |
| SB-03 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | 2.56 J | 5.01 | U | U | U | U | 43.3 J | 27.8 J |
| | 10 - 15 | U | U | U | U | 1.71 J | U | 3.16 J | 8.89 J | U | U | U | U | 62.7 | 51.1 J |
| | 15 - 20 | U | U | U | 26.0 J | 4.31 J | U | 10.5 | U | U | U | U | U | 1,260 | 248 |
| SB-04 | 0 - 5 | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | 10 - 15 | U | U | U | U | 2.69 J | 1.62 J | 3.49 J | 10.1 J | U | U | U | U | 77.2 | 59.4 |
| | 15 - 20 | U J | U J | U J | U J | U J | U J | 2.91 | U J | U J | U J | U J | U J | 69.3 | 123 |
| | 18 - 19 | U J | U J | U J | U J | U J | U J | 12,400 J | U J | U J | U J | U J | U J | 9,790 | 47,500 |
| SB-05 | 0 - 5 | U | 1.87 J | U | U | 4.70 | 2.29 J | U | 9.79 | U | U | U | U | 19.9 J | 16.3 J |
| SB-06 | 0 - 5 | U | U | U | 2.37 J | U | U | 1.23 J | 19.5 | U | U | U | U | 21.4 J | 30.2 J |
| | 5 - 10 | 1.33 J | 1.09 J | U | U | U | U | 14.0 | U | U | U | U | U | 135 | 121 |
| | 10 - 15 | U | U | U | U | U | U | 7.18 | U | U | U | U | U | 150 | 82.1 |
| | 15 - 20 | U J | U J | U J | U J | U J | U J | 1.20 J | U J | UJ | U J | U J | UJ | U | U |
| SB-07 | 0 - 5 | U J | U J | U J | U J | 60.8 J | 59.5 J | 89.4 J | U J | U J | U J | U J | U J | 1,680 J | 4,580 J |
| | 5 - 10 | U J | U J | U J | 23.8 J | 66.1 J | 30.5 J | U J | 224 J | U J | U J | U J | U J | 270 J | 170 J |
| | 10 - 15 | U | 31.7 | 67.3 | 353 | 1,210 | 207 | U | 725 | U | 3.12 J | U | 6.34 | U | U |
| SB-08 | 0 - 5 | U | U | U | U | 3.29 J | U | U | 17.1 | U | U | U | U | 78.7 | 103 |
| | 5 - 10 | U J | 14.0 J | U J | 20.9 | 225 J | 164 J | 391 J | 184 J | 253 J | U J | U J | U J | 408 | 2,070 |
| | 10 - 15 | U | U | U | 30.3 J | 25.9 J | 27.0 J | 59.3 J | U J | 135 J | U J | U J | U J | U | U |
| SB-09 | 0 - 5 | U | U | U | U | U | U | U | 1.94 J | U | U | U | U | 179 | 20.5 J |
| | 5 - 10 | U | U | U | U | U | U | 23.6 | U | U | U | U | U | 1,410 | 887 |
| SB-10 | 0 - 5 | U | U | U | U | 1.70 J | U | U | 8.25 | U | U | U | U | U | U |
| | 5 - 10 | U | U | U | U | U | U | U | 3.58 J | U | U J | U J | U | 105 | 14.4 J |
| | 10 - 15 | U | U | U | U | 3.27 J | U | 31.0 | U | U | U J | U | U | U | U |
| SB-12 | 0 - 5 | U J | U J | U J | U J | 128 J | 115 J | 49.6 J | U J | U J | U J | U J | U J | 907 | 841 |
| SB-13 | 0 - 5 | U | U | U | U | U | U | 8.17 | U | U | U | 9.96 J | U | 106 | 580 |
| | 5 - 10 | U | U | U | 22.9 J | 22.1 J | 8.11 J | U | 323 J | 12.7 J | U | U | U | U | U |
| SB-14 | 0 - 5 | U | U | U | U | 4.37 J | U | 8.10 | 22.7 J | U | U J | 3.79 J | U | 359 | 553 |
| SB-15 | 0- 5 | U | U | 1.85 J | U | 42.4 | 6.73 | 9.30 | 86.3 | U | U J | U | U | 79.3 | 287 |
| | | micrograms/kilogram | | | | | | | | | | | | | |

TABLE 7 (CONTINUED)
RESULTS OF PESTICIDE/PCB ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | DEPTH* | d-BHC | Heptachlor | Heptachlor Epoxide | Aldrin | g-Chlordane | a-Chlordane | p,p'-DDE | Dieldrin | p,p'-DDD | p,p'-DDT | Endosulfan Sulfate | Endrin Ketone | Aroclor 1232 | Aroclor 1260 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SB-16 | 0 - 5 | U | U | U | U | U | U | U | U | U | U J | U | U | 47.1 J | U |
| | 5 - 10 | U | U | U | U | U | U | 3.02 J | 6.58 J | U | U | U J | U | 54.4 J | 54.9 |
| | 10 - 15 | U | U | U | U | U | U | 5.86 | U | U | U | U J | U | 81.7 | 79.5 |
| | 15 - 20 | U J | U J | U J | U J | 11.2 J | U J | 25.0 J | U J | U J | U J | U J | U J | U | U |
| SB-17 | 0 - 3 | U J | U J | U J | U J | 25.2 J | U J | U J | 20.9 J | U J | U J | U J | U J | U | U |
| SB-18 | 0 - 5 | U | U | U | U | U | U | U | 2.21 J | U | U | U | U | U | U |
| | 5 - 10 | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U | U |
| | 10 - 15 | U | U | U | U | U | U | 1.45 J | 3.47 J | U | U | U | U | U | U |
| SB-19 | 0 - 5 | 27.9 J | U J | U J | 48.3 J | 27.5 J | U J | 143 J | U J | U J | U J | U J | U J | 4,160 J | 3,170 J |
| SB-20 | 0 - 5 | U J | U J | U J | 10.4 J | 17.9 J | U J | 64.6 J | U J | U J | U J | U J | U J | 624 J | 2,460 J |
| SB-21 | 0 - 5 | U J | U J | U J | U J | 11.8 J | U J | 39.1 J | U J | U J | U J | U J | U J | 361 | 381 |
| | 10 - 15 | U | 1.40 J | U J | 23.9 J | 449 J | 226 J | U J | 2,720 J | U J | U J | U J | U J | U | 226 |
| SB-22 | 0 - 2 | U | 14.8 | 4.63 J | U | 14.0 | 2.39 J | U | 17.3 | U | U | U | U | U | U |
| SB-23 | 0 - 2 | U | 2.05 J | U | U | 60.9 | 14.0 | 12.5 | 107 J | U | U | U | U | 448 | 243 |
| Inside Pile | | U | U | U | U | 2.19 J | 2.05 J | U | U J | 3.66 | 2.64 J | U | U | U | U |
| Furnace Dust E | | U | U | U | U | U | U | U | 1.94 J | U | U | U | U | 40.1 J | U |
| Furnace Dust W | | U | U | U | U | U | U | U | U | U | U | U | U | 77.4 | U |
| Inside Stack | | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| | | micrograms/kilogram | | | | | | | | | | | | | |

* feet below ground surface
J = estimated value
U = non-detect

TABLE 8
RESULTS OF TAL METALS ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

Location/Depth (Feet)

| | SB-1 0-5 | SB-1 7-8 | SB-1 10-15 | SB-2 0-5 | SB-2 5-10 | SB-2 10-15 | SB-3 0-5 | SB-3 5-10 | SB-3 10-15 | SB-3 15-20 | SB-4 0-5 | SB-4 5-10 | SB-4 10-15 | SB-4 15-20 | SB-4 18-19 | SB-5 0-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 163000 | 188000 | 71000 | 164000 | 174000 | 117000 | 197000 | 150000 | 182000 | 145000 | 103000 | 167000 | 170000 | 129000 | 98.5 | 116000 |
| Antimony | U | U | U | U | U | U | U | U | U | U | U | U | U | U | 1.38 | U J |
| Arsenic | U | 2.23 | U | 2.93 | 2.15 | 13.2 | U | 4.17 | 3.73 | 4.16 | 11.8 | U | 3.38 | 4.93 | 1.48 | 4.42 |
| Barium | 107 J+ | 411 J+ | 60.9 J+ | 108 J+ | 76.1 J+ | 106 J+ | 145 J+ | 97.9 J+ | 139 J+ | 87.1 J+ | 62.1 J+ | 60.3 J+ | 101 J+ | 58.9 J+ | 0.394 J+ | 100 J+ |
| Beryllium | 0.741 | 1.30 | 4.59 | 3.68 | 2.84 | 2.74 | 0.819 | 3.76 | 4.40 | 2.10 | 1.63 | 1.53 | 3.43 | 2.84 | 0.296 | 5.20 |
| Cadmium | U J | U J | 0.495 J | 2.24 J | 1.16 J | 5.13 J | 0.719 J | 1.55 J | 3.81 J | 3.01 J | 0.800 J | 0.475 J | 1.21 J | 0.858 J | 0.394 J | 1.08 J |
| Calcium | 9360 | 10500 | 29100 | 35300 | 14900 | 47700 | 25100 | 13100 | 17200 | 18900 | 5370 | 12500 | 17800 | 81400 | 9.76 | 32200 J |
| Chromium | 112 J+ | 132 J+ | 40.9 J+ | 171 J+ | 127 J+ | 1270 J+ | 93.8 J+ | 154 J+ | 191 J+ | 78.4 J+ | 54.9 J+ | 69.9 J+ | 118 J+ | 72.7 J+ | 0.493 J+ | 174 J+ |
| Cobalt | 5.60 | 6.80 | 3.26 | 8.34 | 12.4 | 15.3 | 7.53 | 13.6 | 14.1 | 6.98 | 10.5 | 4.65 | 8.54 | 5.53 | 0.394 | 7.98 |
| Copper | 1900 | 2980 | 314 | 1600 | 929 | 4640 | 1280 | 2280 | 3700 | 1020 | 1170 | 824 | 1210 | 4620 | 0.394 | 1290 |
| Iron | 6610 | 6780 | 5560 | 11200 | 7990 | 33900 | 13800 | 33600 | 12100 | 12800 | 32000 | 7280 | 11800 | 10100 | 14.8 | 13000 |
| Lead | 28.3 | 69.4 | 14.6 | 106 | 135 | 523 | 40.5 | 136 | 106 | 74.5 | 41.4 | 30.9 | 93.6 | 40.9 | 0.985 | 58.1 J+ |
| Magnesium | 6290 | 9670 | 11000 | 19400 | 14200 | 10500 | 14800 | 8450 | 13300 | 6860 | 6260 | 8020 | 11400 | 6550 | 19.7 | 13200 |
| Manganese | 538 | 652 | 471 | 766 | 517 | 1070 | 274 | 719 | 643 | 723 | 598 | 2000 | 527 | 1550 | 0.394 | 603 |
| Mercury | U | U | U | 0.272 | 0.0592 | 0.653 | U | 0.121 | 0.185 | 0.192 | U | 0.0491 | 0.119 | 0.113 | 0.035 | U J |
| Nickel | 130 | 339 | 54.2 | 349 | 200 | 822 | 1020 | 1350 | 395 | 135 | 500 | 195 | 301 | 59.7 | 0.591 | 245 |
| Potassium | 598 J | 622 J | 1190 J | 783 J | 738 J | 1200 J | 170 J | 1040 J | 987 J | 978 J | 2300 J | 1060 J | 1800 J | 1360 J | 123 J | 1730 J |
| Selenium | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | 1.28 J | U |
| Silver | 0.701 | 3.42 | U | 0.952 | U | 0.992 | 0.604 | 0.606 | 10.1 | U | U | U | 0.613 | 2.37 | 0.493 | U |
| Sodium | 2630 | 3410 | 27800 | 10600 | 12800 | 19000 | 1160 | 11000 | 10700 | 16500 | 4570 | 7150 | 8120 | 36800 | 985 | 22800 J |
| Thallium | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | 8.38 J | U J |
| Vanadium | 68.3 | 51.1 | 47.2 | 51.1 | 56.0 | 38.7 | 46.9 | 57.0 | 60.5 | 68.8 | 47.0 | 90.9 | 52.9 | 48.7 | 0.394 | 42.1 J- |
| Zinc | 367 | 1270 | 215 | 1230 | 598 | 1930 | 1000 | 1070 | 1320 | 1610 | 397 | 341 | 944 | 252 | 2.27 | 560 |

| | SB-6 0-5 | SB-6 5-10 | SB-6 10-15 | SB-6 15-20 | SB-7 0-5 | SB-7 5-10 | SB-7 10-15 | SB-8 0-5 | SB-8 0-5 | SB-8 10-15 | SB-9 0-5 | SB-9 5-10 | SB-10 0-5 | SB-10 5-10 | SB-10 10-15 | SB-12 0-5 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 210000 | 210000 | 184000 | 31500 | 167000 | 9120 | 30600 | 160000 | 140000 | 21500 | 167000 | 96.1 | 185000 | 263000 | 123000 | 114000 |
| Antimony | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | 6.73 | U J | U J | 1.61 J | 41.6 J |
| Arsenic | 3.06 | 2.71 | 3.95 | 17.3 | 6.15 | 21.6 | 10.1 | 2.42 | 4.25 | 18.4 | 3.64 | 1.44 J | U | U | 5.17 | 6.72 |
| Barium | 92.7 J+ | 81.0 J+ | 111 J+ | 83.4 J+ | 107 J+ | 166 J+ | 107 J+ | 61.2 J+ | 99.8 J+ | 279 J+ | 116 J+ | 0.384 | 103 J+ | 11.7 J+ | 113 J+ | 198 J+ |
| Beryllium | 4.93 | 6.80 | 5.94 | 0.939 | 2.83 | 0.602 | 2.15 | 2.54 | 2.21 | 1.01 | 5.62 | 0.288 J+ | 3.25 | U | 1.88 | 3.23 |
| Cadmium | 1.73 J | 2.17 J | 6.29 J | U J | 5.05 J | 1.32 J | U J | 1.87 J | 5.74 J | 2.73 J | 2.82 J | 0.384 | 0.959 J | U J | 2.97 J | 1.89 J |
| Calcium | 10400 J | 12900 J | 17500 J | 3530 J | 25900 J | 76800 J | 67700 J | 9690 J | 12500 J | 38800 J | 18700 J | 9.52 J | 10100 J | 3390 J | 11600 J | 67600 J |
| Chromium | 184 J+ | 291 J+ | 147 J+ | 51.1 J+ | 317 J+ | 22.2 J+ | 46.3 J+ | 130 J+ | 87.6 J+ | 192 J+ | 215 J+ | 0.481 J | 113 J+ | 29.9 J+ | 161 J+ | 143 J+ |
| Cobalt | 10.5 | 5.14 | 5.49 | 11.2 | 10.7 | 18.3 | 10.0 | 7.15 | 4.93 | 15.3 | 8.65 | 0.384 J+ | 7.39 | 2.45 | 6.54 | 8.08 |
| Copper | 3760 | 1810 | 3170 | 139 | 4710 | 640 | 30.3 | 1810 | 1880 | 256 | 1450 | 0.384 | 2080 | 2690 | 1470 | 1700 |
| Iron | 11900 | 13800 | 12200 | 38700 | 31500 | 61600 | 37400 | 13000 | 12100 | 48100 | 16400 | 14.4 | 9490 | 5300 | 19500 | 16200 |
| Lead | 161 J+ | 108 J+ | 174 J+ | 28.9 J+ | 265 J+ | 559 J+ | 41.3 J+ | 56.6 J+ | 136 J+ | 288 J+ | 106 J+ | 0.961 | 72.0 J+ | 8.16 J+ | 163 J+ | 179 J+ |
| Magnesium | 10300 | 10100 | 13000 | 2100 | 13000 | 9440 | 4020 | 9690 | 7000 | 4520 | 12900 | 19.2 J+ | 10100 | 1850 | 6730 | 16000 |
| Manganese | 633 | 1080 | 765 | 407 | 1060 | 947 | 544 | 456 | 1560 | 3180 | 754 | 0.384 | 507 | 79.6 | 599 | 797 |
| Mercury | 0.0713 J | 0.105 J | 0.450 J | 0.0776 J | 0.648 J | 2.95 J | U J | 0.192 J | 0.575 J | 0.381 J | U J | 0.046 | U J | U J | 0.540 J | 0.444 J |
| Nickel | 816 | 171 | 175 | 26.3 | 381 | 17.5 | 30.7 | 199 | 212 | 30.0 | 416 | 0.577 J | 440 | 34.3 | 105 | 280 |
| Potassium | 2090 J | 595 J | 1060 J | 3940 J | 986 J | 1320 J | 6620 J | 1100 J | 939 J | 3040 J | 1150 J | 120 | 299 J | 170 J | 1980 J | 1160 J |
| Selenium | U | U | 2.41 | 1.96 | U | U | U | U | U | U | U | 1.25 J | U | U | U | U |
| Silver | 1.24 | 0.724 | 1.51 | U | 2.72 | 1.09 | U | 0.677 | 0.710 | U | 0.774 | 0.481 | U | U | 0.579 | U |
| Sodium | 2790 J | 44900 J | 36600 J | 6230 J | 4020 J | 3370 J | 10400 J | 3160 J | 4180 J | 6460 J | 8190 J | 481 | 2860 J | 2830 J | 86400 J | 3250 J |
| Thallium | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | 8.17 J | U J | U J | U J | U J |
| Vanadium | 54.6 J- | 62.8 J- | 86.6 J- | 42.7 J- | 60.7 J- | 19.1 J- | 48.3 J- | 52.8 J- | 54.9 J- | 41.9 J- | 91.0 J- | 0.384 J | 51.3 J- | 84.1 J- | 36.5 J- | 41.7 J- |
| Zinc | 1950 | 937 | 1170 | 104 | 2330 | 2840 | 131 | 694 | 1290 | 516 | 1080 | 2.21 J- | 899 | 90.8 | 1010 | 1480 |

milligrams/kilogram

TABLE 8 (CONTINUED)
RESULTS OF TAL METALS ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

Location/Depth (Feet)

| | SB-13 0-5 | SB-13 5-10 | SB-14 0-5 | SB-15 0-5 | SB-16 0-5 | SB-16 5-10 | SB-16 10-15 | SB-16 15-20 | SB-17 0-3 | SB-18 0-5 | SB-18 5-10 | SB-18 10-15 | SB-19 0-5 | SB-20 0-5 | SB-21 0-5 | SB-21 10-15 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Aluminum | 213000 | 34100 | 133000 | 151000 | 217000 | 134000 | 144000 | 76300 | 126000 | 177000 | 104000 | 210000 | 118000 | 136000 | 139000 | 19100 |
| Antimony | 2.54 J | U J | 4.09 J | 2.88 | U | U | U | 1.41 | U | 1.78 | U | U | U | U | U | U |
| Arsenic | 5.29 | 14.6 | 9.29 | 7.82 | 2.51 | 3.49 | 2.06 | 9.65 | 2.33 | 4.63 | U | 4.71 | 3.74 | 3.76 | 3.68 | 11.3 |
| Barium | 140 J+ | 105 J+ | 224 J+ | 137 J+ | 181 J+ | 99.5 J+ | 172 J+ | 153 J+ | 169 J+ | 109 J+ | 68.7 J+ | 92.2 J+ | 162 J+ | 44.9 J+ | 114 J+ | 136 J+ |
| Beryllium | 4.13 | 2.15 | 4.90 | 4.11 | 1.54 | 6.60 | 2.34 | 2.26 | 2.46 | 2.58 | 0.823 | 1.08 | 6.35 | 0.918 | 3.16 | U |
| Cadmium | 33.9 J | 0.718 J | 13.4 J | 12.9 | 5.77 | 2.81 | 1.14 | 8.93 | U | 16.0 | 0.562 | 0.947 | 8.20 | U | 0.552 | 3.49 J |
| Calcium | 13800 J | 11100 J | 37800 J | 50600 | 16100 | 25000 | 18700 | 44400 | 24700 | 15000 | 10500 | 27000 | 50500 | 24000 | 19200 | 52000 |
| Chromium | 254 J+ | 31.2 J+ | 97.5 J+ | 146 | 89.8 | 172 | 108 | 322 | 163 | 185 | 97.9 | 108 | 67.3 | 194 | 124 | 46.0 |
| Cobalt | 6.90 | 8.67 | 7.79 | 7.60 | 8.13 | 7.34 | 7.57 | 9.06 | 14.0 | 8.40 | 5.05 | 7.00 | 5.06 | 6.68 | 6.38 | 18.1 |
| Copper | 4140 | 42.4 | 1400 | 2170 | 1270 | 1580 | 1020 | 2030 | 1510 | 2880 | 3510 | 1660 | 1370 | 3240 | 1160 | 56.3 |
| Iron | 10600 | 32400 | 22100 | 16500 | 11700 | 10600 | 9650 | 39500 | 6140 | 12700 | 8640 | 25100 | 11800 | 37900 | 12200 | 27900 |
| Lead | 379 J+ | 46.2 J+ | 335 J+ | 249 J+ | 75.4 J+ | 111 J+ | 67.2 J+ | 630 J+ | 73.6 J+ | 119 J+ | 59.7 J+ | 45.9 J+ | 130 J+ | 61.0 J+ | 83.8 J+ | 181 J+ |
| Magnesium | 16900 | 5960 | 9190 | 17600 | 21800 | 16600 | 17900 | 6740 | 34500 | 8840 | 4900 | 8060 | 15900 | 17200 | 11500 | 12300 |
| Manganese | 1060 | 641 | 871 | 1090 | 366 | 918 | 437 | 809 | 232 | 1220 | 439 | 2360 | 953 | 787 | 684 | 926 |
| Mercury | 0.416 J | 0.189 J | 1.07 J | 0.303 | 0.126 | 0.076 | U | 4.72 | U | 0.0652 | U | U | 0.683 | U | 0.0956 | 0.220 |
| Nickel | 292 | 17.9 | 114 | 256 J | 800 J | 408 J | 525 J | 147 J | 543 J | 374 J | 118 J | 158 J | 77.2 J | 906 J | 232 J | 29.7 J |
| Potassium | 1110 J | 8420 J | 2650 J | 1360 | 973 | 2480 | 3530 | 2770 | 1570 J | 1240 | 693 J | 1340 J | 1360 J | 960 | 998 J | 3440 |
| Selenium | 2.82 | 9.87 | U | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J |
| Silver | 0.877 | U | 0.581 | 0.878 | U | 0.753 | U | 0.636 | 0.890 | U | 0.677 | U | U | U | 0.714 | U |
| Sodium | 5300 J | 12800 J | 28200 J | 3180 | 1910 | 18700 | 13600 | 17800 | 9140 | 4290 J | 42700 | 27900 | 19200 | 4770 | 13500 | 6150 J |
| Thallium | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J | U J |
| Vanadium | 68.4 J- | 38.0 J- | 41.2 J- | 43.7 | 53.6 | 45.9 | 43.4 | 32.9 | 87.6 | 52.1 | 25.0 | 51.4 | 37.9 | 47.0 | 45.1 | 47.3 |
| Zinc | 4380 | 375 | 1730 | 1730 | 1130 | 870 | 531 | 1540 | 562 | 1190 | 521 | 296 | 1370 | 663 | 623 | 362 |
| | milligrams/kilogram | | | | | | | | | | | | | | | |

| | SB-22 0-2 | SB-23 0-2 | Inside Pile | Boiler Dust E |
|---|---|---|---|---|
| Aluminum | 216000 | 127000 | 156000 | 128000 |
| Antimony | U | 2.07 | 3.34 | 7.09 |
| Arsenic | U | 13.0 | 2.13 | 59.6 |
| Barium | 145 J+ | 177 J+ | 164 J+ | 246 J+ |
| Beryllium | 1.18 | 3.83 | 2.25 | 1.36 |
| Cadmium | 0.792 | 11.2 | 0.900 | 2.83 J |
| Calcium | 13800 | 30600 | 11800 | 25400 |
| Chromium | 73.7 | 133 | 133 | 83.1 |
| Cobalt | 8.32 | 12.7 | 6.06 J | 9.40 |
| Copper | 2310 | 1340 | 1560 | 2700 |
| Iron | 6380 | 29500 | 8960 | 73800 |
| Lead | 27.2 J+ | 260 J+ | 75.2 J+ | 81.0 J+ |
| Magnesium | 11400 | 11600 | 9310 | 11900 |
| Manganese | 319 | 1120 | 511 | 630 |
| Mercury | U | 0.356 | U | 0.221 |
| Nickel | 1410 J | 342 J | 145 J | 516 J |
| Potassium | 383 | 3390 | 30800 | 5860 |
| Selenium | U J | U J | U J | U J |
| Silver | 0.829 | 0.724 | 0.806 | U |
| Sodium | 2670 | 1270 | 129000 | 79500 |
| Thallium | U J | U J | U J | U J |
| Vanadium | 53.5 | 56.6 | 35.8 | 30.5 |
| Zinc | 596 | 1430 | 1150 | 6070 |
| | milligrams/kilogram | | | |

J+ = value estimated high
J- = value estimated low

TABLE 9
RESULTS OF INORGANIC ANALYSES - SOIL SAMPLES
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | Cyanide | Nitrogen, Ammonia | Nitrogen, Nitrate | Nitrogen, Nitrate + Nitrite | Nitrogen, Nitrite | Phosphorus | Total Carbon |
|---|---|---|---|---|---|---|---|
| Bag Filter | 0.65 | 9.11 | 1,330 | 1,330 | 0.65 | 218 | NA |
| Inside Pile | 0.92 | 3,770 | NA | NA | NA | NA | NA |
| SB-2 (5 - 10') | R | 316 | NA | NA | NA | NA | NA |
| SB-16 (13-15') | U | 508 | NA | NA | NA | NA | NA |
| SB-19 (4') | U | 151 | NA | NA | NA | NA | 88,400 |
| SB-22 (2') | 0.79 | 15.5 | NA | NA | NA | NA | NA |
| | milligrams/kilogram | | | | | | |

U = non-detect
R= reject
NA - not analyzed

TABLE 10
RESULTS OF VOC ANALYSES - SURFACE WATER, SPRING AND MONITOR WELL SAMPLES
DECEMBER 2006 MOBILIZATION
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | Acetone | Methylene Chloride | 2-Butanone | cis-1,2-Dichloroethene | Benzene | Trichloroethene | 4-Methyl-2-pentanone | Toluene | Tetrachloroethene | Chlorobenzene | Ethylbenzene | p&m-Xylene | 0-Xylene | p-Isopropyltoluene | Napththalene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Background* | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Leachate Seep | 101 J | 1.65 J | 10.6 | U | U | U | 2.65 J | 1.38 J | U | U | U | 1.85 J | U | U | U |
| Stream** | 45.7 | | 8.21 | U | U | U | 1.90 J | U | U | U | U | U | U | U | U |
| Pond | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Mayo Spring | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| Spring 2 | U | U | U | 6.04 | U | 2.51 J | U | U | 13.1 | U | U | U | U | U | U |
| TW-1 | U | U | U | U | U | U | U | U | U | U | U | U | U | U | U |
| TW-2 | U | U | U | U | U | U | 2.28 J | U | U | U | U | U | U | U | U |
| TW-5 | 202 J | 4.11 J | 37.5 | U | 1.26 J | U | 17.7 | 10.6 | 2.67 J | U | 4.37 J | 15.9 | 7.04 | U | 2.14 J |
| TW-7 | U | 7.33 | U | U | 1.32 J | 1.45 J | 13.1 | U | 7.24 | 3.01 J | 3.59 J | 10.7 | 5.62 | 5.23 | 7.25 |
| | micrograms/liter | | | | | | | | | | | | | | |

U = non-detect
J = estimated
* Stream background, upgradient from site
** Downgradient from site
TW - temporary monitor well

TABLE 11
RESULTS OF BNA ANALYSES - SURFACE WATER, SPRING AND MONITOR WELL SAMPLES
DECEMBER 2006 MOBILIZATION
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | Phenol | Benzyl Alcohol | 2- Methylphenol | 4-Methylphenol | 2,4-Dimethylphenol | 4-Nitrophenol | 4-Chloro-3-methylphen | Pentachlorophenol |
|---|---|---|---|---|---|---|---|---|
| Background* | U | U | U | U | U | U | U | U |
| Leachate Seep | 5.3 J | U J | U | U | U | U | U | 9.56 J |
| Stream** | 21.2 | U | U | U | U | 3.99 J | U | 11.9 J |
| Pond | U | U | U | U | U | U | U | U |
| Mayo Spring | U | U | U | U | U | U | U | U |
| Spring 2 | U | U | U | U | U | U | U | U |
| TW-1 | U | U | U | U | U | U | U | U |
| TW-2 | NA | NA | NA | NA | NA | NA | NA | NA |
| TW-5 | 304 | 3.27 J | 2.97 J | 24.5 | 7.79 J | U | 29.4 | 11.2 J |
| TW-7 | 204 | U J | U | 5.94 J | U | U | U | 16.5 J |

U = non-detect
J = estimated
NA =not analyzed
* stream background, upgradient from site
** downgradient from site
TW - temporary monitor well

TABLE 12
RESULTS OF PESTICIDE/PCB ANALYSES
SURFACE WATER, SPRING AND MONITOR WELL SAMPLES
DECEMBER 2006 MOBILIZATION
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| LOCATION | Heptachlor Epoxide | g-Chlordane | a-Chlordane | Dieldrin | Endosulfan (II) |
|---|---|---|---|---|---|
| Background* | U | U | U | U | U |
| Leachate Seep | 0.00986 J | 0.0139 J | 0.0159 J | 0.169 J | 0.0308 J |
| Stream** | U | 0.0130 J | 0.0169 J | 0.0178 J | U |
| Pond | U | U | U | U | U |
| Mayo Spring | U | U | U | U | U |
| Spring 2 | U | U | U | U | U |
| TW-1 | U | U | U | 0.612 | U |
| TW-2 | U | U | U | U | U |
| TW-5 | U | U | U | 0.713 J | 0.211 J |
| TW-7 | 0.0107 J | U | U | U | U |

U = non-detect
J = estimated
NA =not analyzed
* stream background, upgradient from site
** downgradient from site
TW - temporary monitor well

TABLE 13
RESULTS OF SELECTED METALS ANALYSES
SURFACE WATER, SPRING AND MONITOR WELL SAMPLES
DECEMBER 2006 MOBILIZATION
SMOKEY MOUNTAIN SMELTER SITE
KNOXVILLE, TENNESSEE

| | Aluminum | Calcium | Iron | Magnesium | Manganese | Potassium | Sodium |
|---|---|---|---|---|---|---|---|
| LOCATION | | | | | | | |
| Background* | U | 59.3 | 0.155 | 4.76 | 0.047 | 0.665 | U |
| Leachate Seep | 0.935 | 10.2 | 0.106 | 6.82 | 0.116 | 367 | 7,010 |
| Stream** | 0.896 | 11.2 | 0.048 | 7.26 | 0.224 | 366 | 6,930 |
| Pond | 0.91 | 37 | 1.38 | 5.77 | 0.182 | 20.5 | 95.5 |
| Mayo Spring | U | 200 | U | 15.1 | 0.058 | 7.59 | 327 |
| Spring 2 | 0.129 | 161 | 0.577 | 12.7 | 0.148 | 1.21 | 126 |
| TW-1 | 111 | 15.5 | 18.2 | 20.7 | 0.617 | 132 | 1,310 |
| TW-2 | 22 | 257 | 336 | 96.6 | 135 | 406 | 10,700 |
| TW-5 | 19.1 | 56.9 | 17.5 | 18.6 | 19.1 | 651 | 17,200 |
| TW-7 | 166 | 23.9 | 37.9 | 11.5 | 1.02 | 182 | 4,610 |
| | milligrams/liter | | | | | | |

* Stream background, upgradient from site
** Downgradient from site
TW - temporary monitor well

TABLE 14
TEMPORARY MONITOR WELL DATA
SMOKEY MOUNTAIN SMELTER SITE
KNOX COUNTY, TENNESEE

| Well No. | Soil Boring Location | Total Depth | Screen | DTW* | Stick-Up | G. S. Elevation | W. L. Elevation |
|---|---|---|---|---|---|---|---|
| TW-1 | SB-1 | 14.2 | 8-13 | 9.20 | 2.1 | 917.58 | 910.48 |
| TW-2 | SB-6 | 20.0 | 15-20 | 17.27 | 4.0 | 915.84 | 902.57 |
| TW-3 | SB-7 | 25.0 | 20-25 | 19.60 | 0.9 | 918.60 | 899.90 |
| TW-4 | SB-12 | 35.0 | 30-35 | 31.63 | 0.2 | 909.99 | 878.56 |
| TW-5 | SB-10 | 30.0 | 25-30 | 17.05 | 0.5 | 920.91 | 904.36 |
| TW-6 | SB-14 | 10.0 | 5-10 | dry | 0.1 | 915.38 | NA |
| TW-7 | SB-2 | 20.0 | 15-20 | 15.99 | 0.9 | 921.50 | 906.41 |
| up gradient | NA | 30.0 | 25-30 | dry | NA | NA | NA |

all measurements in feet
* from top of casing

DTW = Depth to Water
G.S. = Ground Surface
W. L. = Water Level
NA = Not Applicable